



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

08/988.686 12/11/97 KONECNI

A TI-22166

023494 MM92/0104
TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS TX 75265

EXAMINER

EATON, K

ART UNIT

PAPER NUMBER

2823

DATE MAILED:
01/04/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

08/988,686

Applicant(s)

KONECNI ET AL.

Examiner

Kurt M. Eaton

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2000.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 21 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakata, as previously applied in the office action mailed 8/30/00.
3. Claims 21, 23, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Taguwa, as previously applied in the office action mailed 8/30/00.
4. Claims 21, 22, 26, 29, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Park.

In re claim 21, Park shows in Figure 3 a method of fabricating an electronic device having a first conductive structure (34) electrically connected to a second conductive structure (42) situated over a semiconductor substrate, the method including the steps of forming the first conductive structure; forming an insulating layer (36) over the first conductive structure, wherein the insulating layer has an opening with sidewalls and a bottom and exposes a portion of the first conductive structure; providing a gas including hydrogen incorporated into the opening in the insulating layer; and depositing a conductive material (42) into the opening using CVD {column 2, line 44 – column 3, line 33}.

Art Unit: 2823

In re claim 22, Park shows wherein the gas additionally includes helium {column 3, lines 25-29}.

In re claim 26, Park shows wherein the plasma has a plasma power of from about 150 watts to about 450 watts {column 2, line 66 – column 3, line 5}.

In re claims 29 and 30, Park shows wherein the step of providing a gas into the opening is at a temperature from about 100 °C to about 450 °C {column 2, line 66 – column 3, line 7}.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 27, 28, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Pan et al..

In re claims 27 and 28, Park substantially discloses the invention as claimed but fails to show wherein the plasma has a bias power up to about 300 watts.

Pan et al. (herein referred to as Pan) teaches, in an analogous art related to a method of etching structures, that a bias power from about 20 to about 1000 watts is applied to a plasma used to etch a material in order to provide a more anisotropic and directional etch perpendicular to the surface of the substrate {column 6, lines 16-30}.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a bias to the plasma of Park since, as evidenced by Pan, a biased etching plasma

Art Unit: 2823

would provide a more anisotropic and directional etch perpendicular to the surface of the substrate thereby increasing the effectiveness at which Park the gas including hydrogen could be delivered to the surface of the substrate at the bottom of the opening. It also would have been obvious to bias the plasma of Park in view of Pan using a power up to about 300 watts since a plasma biasing power level is a well known processing variable and the discovery of the optimum or workable biasing power involves only routine skill in the art. Furthermore, the specification contains no disclosure of either the critical nature of the claimed plasma biasing power or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen plasma biasing powers or upon another variable recited in a claim, the applicant must show that the particular biasing powers are critical.

In re claims 31 and 32, Park shows wherein the step of providing a gas into the opening is at a temperature from about 100 °C to about 450 °C {see Park, column 2, line 66 – column 3, line 7}.

Response to Arguments

7. Applicant's arguments filed 10/17/00 have been fully considered but they are not persuasive.

8. Applicant contends that the invention of Nakata clearly indicates the use of a chemistry that was taught in applicants specification as undesirable and that the use of a hydrogen plasma chemistry is nowhere taught or even remotely suggested by Nakata. Accordingly, applicant contends that the inventive concept of applicants claims is nowhere taught or even remotely suggested by Nakata.

The examiner respectfully submits the following. Whether or not Nakata clearly indicates the use of a chemistry that was taught in applicants specification as undesirable is irrelevant because there is nothing in the claims that states applicants invention cannot use the undesirable chemistry. The

Art Unit: 2823

examiner also respectfully submits that Nakata does teach the use of a hydrogen plasma chemistry {see Nakata, column 4, line 19 – column 10, line 44}.

9. Applicant contends Nakata does not teach or suggest wherein the conductive material includes a material selected from the group of: aluminum, copper, titanium, and a combination thereof. The examiner respectfully directs applicant to Nakata wherein Nakata teaches wherein the conductive material includes a material selected from the group of: aluminum, copper, titanium, and a combination thereof {see Nakata, column 7, lines 54-59, and Figure 5F}.

10. The declaration filed on 10/17/00 has been considered but is ineffective to overcome the Taguwa and Park references.

While the declarations of Barton E. Showalter and Christopher W. Kennerly do demonstrate reasonable diligence up to the filing of the provisional application (Serial No. 60/033,728, filed December 20, 1996) upon which the subject application is based, they fail to adequately provide a showing that subject matter commensurate with the scope of the claims was conceived of and present in the application on or before November 21, 1996. While activity toward preparation and filing of the application commenced at least as early as September 17, 1996 with continual activity thereafter, and according to items 9 through 11 of the declarations, comments from the inventors were incorporated into the patent application on December 16, 1996. It was not until after these comments were incorporated that the provisional application was filed. Accordingly, there is insufficient evidence provided to show that the invention commensurate with the scope of the claims was conceived prior to or on November 21, 1996.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Paper related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication of earlier communication from the examiner should be directed to **Kurt Eaton** at **(703) 305-0383** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via kurt.eaton@uspto.gov.



OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800